

ABSTRACT

Spin-based microelectronic devices can be realized by utilizing ferromagnetic structures that make good ohmic contact with silicon, in order to avoid the Schottky barrier problem plaguing existing approaches to spin-based microelectronics, while allowing the devices to be based on silicon substrates, which are well-known and used in the industry. Thin layers of metal silicide, such as CoSi_2 and NiSi_2 , are used as an intermediate layer between ferromagnetic contacts, such as cobalt and nickel contacts, and the silicon substrate. The thin silicide layers provide good ohmic contact between the ferromagnetic contacts and silicon, such that spin-polarized carriers can be injected into the silicon, and detected out of the silicon, without loss of spin polarization.